

Chapter 6 RECOMMENDATIONS

An evaluation of the demands and water resources for the Kissimmee Basin (KB) Planning Area suggests that the ground water supplies in the Orange-Osceola County Area and surface water supplies in the Lake Istokpoga-Indian Prairie Basin may not be sufficient to meet the 2020 (1-in-10 drought year) water supply needs for these areas. In the Orange-Osceola County Area, the continued use of the Floridan aquifer has been projected to contribute to possible harm to wetlands, reduction in spring flow and may be an factor in the formation of sinkholes. In the Lake Istokpoga-Indian Prairie Basin, there have historically been concerns over the availability of water from the canal system to meet the existing demands. In both of these cases, the analyses performed also indicated that a number of issues must be resolved prior to fully determining whether there is sufficient water available for each of these areas. To this end, the District has identified 14 recommendations that address the unresolved issues and that seek to develop facilities to deliver alternative sources of water.

With the assistance of the advisory committee, the District identified a series of water source options for each of the two areas of concern. **Table 30** summarizes the options that address issues for the Orange-Osceola County Area and Lake Istokpoga-Indian Prairie Basin.

Table 30. Water Source Options of the Kissimmee Basin Planning Area.

Water Source Option	Orange-Osceola County Area	Lake Istokpoga-Indian Prairie Basin
Stormwater Drainage Well	X	N/A ^a
Stormwater Reuse	X	N/A
Wastewater Reuse	X	N/A
Urban Conservation	X	N/A
Agricultural Conservation	X	X
Floridan Aquifer	X	X
Surface Water	X	X
Brackish Ground Water	X	N/A
Reservoirs	X	X
Aquifer Storage and Recovery	X	X
Surficial Aquifer	X	X

a. N/A = not applicable.

The advisory committee suggested that the District consider a number of recommendations under each of the identified water supply options. These recommendations are summarized in Chapter 5. The recommendations in this chapter are organized into water resource development recommendations and water supply development recommendations. Water resource development recommendations are primarily the responsibility of the District. Activities such as research, testing, operations and construction are examples of where the District might participate in resource development projects. Recommendations in the water supply development category are primarily the responsibility of local governments, water suppliers, and water users. Activities such as construction and development of infrastructure related to individual facilities are examples of water supply development projects. Water supply development projects may be eligible for District funding assistance if they meet the statutory requirements explained later in this chapter.

The recommendations and insights provided by the advisory committee were reviewed by the District and then formulated into strategies directed at addressing the identified water resource concerns occurring in both the SFWMD and SJRWMD. Where possible, the District incorporated the recommendations of the committee into these strategies, but in some instances addressing all of the committee's suggestions was not possible. Strategies, with recommendations on implementation, have been developed separately for the Orange-Osceola County Area and for the Lake Istokpoga-Indian Prairie Basin. Where appropriate, tasks have been identified to clarify major components of a recommendation. Each recommendation ends with a summary of the pertinent information including estimated costs, potential quantity of water developed, funding and implementing agencies, and a schedule for activities.

Costs and funding sources are provided for each water resource and water supply development recommendation. Funding includes both monetary sources and human resources expressed in full-time equivalencies (FTEs). Monetary sources of funding are described in dollar amounts and include monies from the District and other agencies, while FTEs represent the estimated hours to be worked by District staff. The costs associated with FTE assignments are not included in the total dollar amounts presented. The funding approach for the KB Water Supply Plan as well as potential funding sources for water resource development recommendations and water supply development recommendations are described later in this chapter. The recommendations contained in this plan are subject to District Governing Board budgetary appropriation for future fiscal years. Further discussion of funding and the funding approach is provided in a later section of this chapter.

For the purposes of organization, water resource development recommendations and water supply development recommendations are organized in this chapter into groupings for the Orange-Osceola County Area and the Lake Istokpoga-Indian Prairie Basin.

ORANGE-OSCEOLA COUNTY AREA

A number of water source options were reviewed to assess those which have had the most potential to address the identified water supply issues in the Orange-Osceola County Area. These options strive to resolve the identified concerns of wetland vulnerability, reduction of spring discharges, potential for saline water movement, and sinkhole formation. **Table 31** shows how the options were ranked with regards to addressing the identified water resource protection issues. The Floridan aquifer, which is ranked “low” in the table, remains a viable source of water for the immediate future. However, the results of the regional analysis indicate that a number of issues must be resolved prior to fully determining whether there is sufficient water available for long-term allocation.

Table 31. Water Source Options Ranking for the Orange-Osceola County Area.

Water Source Options	Water Resource Issues				
	Wetland Vulnerability	Spring Discharges	Saline Water Movement	Sinkhole Formation	Overall Ranking
Wastewater Reuse	H ^a	H	H	H	H
Surface Water	M ^b	M	M	M	M
Reservoirs	M	M	M	M	M
Aquifer Storage and Recovery	M	M	M	M	M
Stormwater Drainage Wells	L ^c	M	H	L	M
Stormwater Reuse	M	M	M	L	M
Urban Conservation	L	L	L	L	L
Agricultural Conservation	L	L	L	L	L
Surficial Aquifer	L	L	L	L	L
Brackish Ground Water	L	L	N/A ^d	N/A	L
Floridan Aquifer	L	L	L	L	L

a. H = High: Most potential to address water resource issues.

b. M = Medium: Moderate potential to address water resource issues.

c. L = Low: Least potential to address water resource issues.

d. N/A = Not applicable: Does not address water resource issues.

An examination of the identified options indicates a grouping of the options can be made based upon the approach or strategy that each takes in trying to address possible harm to the resource. The options of wastewater reuse, stormwater reuse, reservoirs, drainage wells, and aquifer storage and recovery (ASR) have been grouped as an aquifer recharge strategy. The options of urban and agricultural conservation and reuse as a replacement for irrigation have been combined into a demand reduction strategy. The

options of the surficial aquifer, surface water, brackish ground water and additional ground water use are grouped as a strategy of alternative sources and optimization of future Floridan aquifer use.

Identified Strategies

In summary, the three identified strategies for the Orange-Osceola County Area are as follows:

1. Minimize drawdown through Floridan aquifer recharge
2. Minimize drawdown through demand reduction
3. Optimize use of the Floridan aquifer and develop alternative water supply sources

The following sections discuss each of these strategies and how the options identified were incorporated into the plan recommendations.

Strategy 1.0: Minimize Drawdown through Floridan Aquifer Recharge

Comments

This strategy strives to reduce the amount of projected drawdown on the Floridan aquifer by placing more water into the Floridan aquifer to replenish the amount removed. The identified sources for this recharge are reclaimed water and storm water.

Water Resource Development Recommendations

Recommendation 1.1: Develop a Regional Reclaimed Water Optimization Plan

Discussion

The volume of wastewater within the District's portion of Orange and Osceola counties is projected to more than double from the existing 61 MGD to 136 MGD by the year 2020. In 1995, an estimated 49 MGD of treated wastewater was used to replace irrigation demand or for application in high or moderate recharge areas. The volume of additional wastewater that could be available for beneficial uses by 2020 is estimated at 88 MGD. Direct offset of demand and recharge to the Floridan aquifer are among the most beneficial uses and should be preferred where economically feasible.

The District proposes to approach the regional reuse of reclaimed water supply sources by first identifying areas where the most beneficial use of reclaimed water should occur and then determining the appropriate actions that should then be taken to maximize reuse of reclaimed water in these areas. Among the considerations affecting wastewater reuse are supply availability versus the peak use and the transport of water to where it can

be best utilized. Other concerns that need to be addressed include storage; supplemental sources; utility interconnects; institutional framework and inter-local agreements; local, District and FDEP regulations; funding incentives; and high use by residential reuse customers. Each of these items requires additional study to evaluate the potential costs and identify policy issues that need to be addressed.

A study is recommended to determine where best to use the anticipated supply of reclaimed water. Newly developed or existing ground water flow models are recommended for determining the optimal distribution and the benefits of properly locating the use of reclaimed water. Current geologic and hydrologic information for the Central Florida area is thought to be a limitation on the ability to accurately predict benefits from reuse. A cooperative effort between SFWMD, the USGS, local governments, and the SJRWMD is recommended in the collection of this information and the development of the additional modeling tools.

Summary of Tasks

- Task 1.1.a: The District will participate, along with local utilities, and other WMDs in the development of a regional wastewater reuse plan to optimize the use of reclaimed water to offset Floridan aquifer drawdown and avoid potential harm to the resources. Components of this plan will address storage; supplemental sources; utility interconnects; institutional framework and interlocal agreements; local, District and FDEP regulations; funding incentives; off-peak reclaimed water use and water conservation. An additional component of this plan will also evaluate the most beneficial use of reclaimed water through the use of existing or to be developed ground water modeling tools. The total cost of this task is estimated at \$300,000 with a District cost share at 75 percent.
- Task 1.1.b: The District will complete hydrologic investigations, in cooperation with local, state, and federal agencies, on the surficial, intermediate and Floridan aquifers in support of recharge optimization modeling. Focus of these studies should be on Orange, Osceola, and Polk counties and in areas where the risk of harm to the resources is estimated to be the greatest. The total cost of this task is estimated at \$1,200,000, with District cost share estimated at 80 percent.
- Task 1.1.c: The District should, in conjunction with local government, evaluate the benefits of deep aquifer injection of treated reclaimed water as a means of addressing water storage problems. A Deep Injection Aquifer Recharge Pilot Study is proposed, in partnership with a local sponsor, to investigate the feasibility of injecting treated reclaimed water into the Floridan aquifer as a form of aquifer recharge. This project is expected to improve the understanding of the hydrologic interactions of the upper and lower Floridan aquifer zones, demonstrate the cost effectiveness and improved wet season disposal benefits of injection over surface water disposal. This project also demonstrates a technology that could be implemented by other utilities in

Central Florida. The estimated cost of this project is \$2,000,000 with the District's cost share at 25 percent. Partnership funding is also sought from SJRWMD and the FDEP.

Summary Information

Total Recommendation Cost: \$3,500,000

Estimated District Participation: \$1,825,000 FTEs: 1.6

Potential Funding Source: SFWMD, SJRWMD, USGS, and local governments

Implementing Agency: SFWMD, SJRWMD, USGS, FDEP, and local governments

Quantity of Water Made Available: 87 MGD

Table 32. Summary of Estimated Schedule and District Costs for Recommendation 1.1.

Reclaimed Water Optimization Plan		Plan Implementation Costs (\$1,000s and FTEs^a)											
		FY01		FY02		FY03		FY04		FY05		Total	
Task #	Recommendation	\$	FTE	\$	FTE	\$	FTE	\$	FTE	\$	FTE	\$	FTE
1.1.a	Development of Reuse Plan Est. start date: 10/1/00 Est. finish date: 2/1/05	20	0.10	20	0.10	50	0.10	85	0.10	50	0.25	225	0.55
1.1.b	Hydrologic Investigation for Recharge Modeling Est. start date: 10/1/00 Est. finish date: 2/1/04	300	0.10	400	0.10	200	0.10	100	0.25			1,000	0.55
1.1.c	Reclaimed Water Injection Pilot Project Est. start date: 10/1/00 Est. finish date: 2/1/05	25	0.10	400	0.10	50	0.10	25	0.10	0	0.10	500	0.50
Total		345	0.20	820	0.30	300	0.30	210	0.45	50	0.35	1,725	1.60

a. FTE: Full Time Equivalency.

Recommendation 1.2: Develop Storm Water Reuse Master Plans

Discussion

Storm water is similar to reclaimed water in that opportunities to recharge the Floridan aquifer exist that contribute to offsetting impacts associated with use. It is recommended that the optimization plan described in Recommendation 1.0 should examine storm water reuse as a potential supply.

The use of storm water reuse has historically been limited to irrigation use due to higher treatment costs. The dependability of storm water is also an issue and usually relegates storm water to a backup or supplemental source. On a local scale, storm water has been used for irrigation of landscape. On a regional scale, storm water might be used as a source for augmenting a reclaimed water system. Water storage issues for storm water are much like those discussed under reclaimed water. Elements under this recommendation strive to improve the collection and distribution of storm water for local and regional applications through irrigation.

Another use of collected storm water is for aquifer recharge. Drainage wells located in the metropolitan Orlando area have been used as part of the Orange County storm water system since the early 1900s. An estimated 400 drainage wells currently exist, providing the Orlando area with an estimated 20 to 50 MGD of recharge to the Floridan aquifer. The population in Central Florida is anticipated to nearly double over the planning horizon. Based upon this increase in population and the associated urbanization that will follow, the estimated potential for additional recharge from stormwater injection is also projected to double over the next 20 years.

It is believed that recharge to the aquifer could be substantially increased through the addition of more drainage wells. However, water quality concerns and regulatory issues discourage the construction of new wells. Under current USEPA and FDEP regulatory requirements, water entering an aquifer through a new drainage well would have to meet primary and secondary drinking water standards. Limited information is available about the effects of introducing untreated water into the aquifer through these wells.

The District is currently participating in the Artificial Recharge Demonstration Project along with the Orange County and the SJRWMD. This is a three-year project to evaluate the water quality of water entering the aquifer through these drainage wells and the effectiveness of passive forms of storm water treatment for improving the water quality entering these wells. An additional study is proposed to evaluate more active treatment methods applied to drainage wells such as ultraviolet, membrane, and chemical technologies, off-line storage ponds and other more conventional water treatment technologies.

Summary of Tasks

Task 1.2.a: Evaluate the regional stormwater drainage systems to determine if water is available to augment wastewater reuse systems or to be used for local irrigation. Components of this plan will address stormwater routing, water quality, collection of water to supplement reclaimed water systems and the use of drainage wells to enhance aquifer recharge. This task should be done in conjunction with local government development of stormwater master drainage plans. Determination of the recharge potential from drainage wells completed in conjunction with master storm water planning will be included in the reuse optimization plan described in Recommendation 1.0.

Task 1.2.b: Continue participation in the Artificial Recharge Demonstration Project to evaluate the regulatory, water quality and recharge aspects of drainage wells by participating in demonstration projects. This is a cooperative effort between SFWMD, SJRWMD, Orange County and the city of Orlando and other local governments. The project reviews the effects of injecting untreated storm water on the Floridan aquifer and the effectiveness of passive treatment methods to reduce bacteria. This project also involves working with the USEPA and FDEP to evaluate the water quality standards for water entering the Floridan aquifer. Results of the project will contribute to a determination of the recharge potential of drainage wells in conjunction with master stormwater planning and the optimized reuse plan. Regional ground water modeling tools will be utilized to assist in these determinations.

Task 1.2.c: The District should, in conjunction with local and state governmental agencies, evaluate the benefits of alternative treatment methods for storm water entering drainage wells. The quality of water entering existing and proposed drainage wells is of critical concern and must currently meet primary and secondary drinking water standards on new or modified wells. The proposal creates a demonstration project in conjunction with Orange County Utilities to identify wells receiving the worst water quality and to devise cost-effective treatment to meet the FDEP and USEPA water quality requirements for injection. Treatment methods considered will include ultraviolet, membranes, chemicals, and off-line storage ponds to more conventional water treatment technologies. Increasing the net recharge capacities will be attempted as part of the project in addition to the water quality improvements. Partnerships with the SJRWMD and the FDEP will also be sought on the project. The total cost of this project is estimated at \$1.0 million with the District participation estimated at 50 percent.

Summary Information

Total Recommendation Cost: \$1,155,000

Estimated District Participation: \$655,000 FTEs: 1.0

Potential Funding Source: SFWMD, SJRWMD, city of Orlando, and Orange County

Implementing Agency: SFWMD, SJRWMD, Orange County, and other local governments

Quantity of Water Made Available: 20 to 40 MGD

Table 33. Summary of Estimated Schedule and District Costs for Recommendation 1.2

Storm Water Reuse Master Plans		Plan Implementation Costs (\$1,000s and FTEs ^a)											
		FY01		FY02		FY03		FY04		FY05		Total	
Task #	Recommendation	\$	FTE	\$	FTE	\$	FTE	\$	FTE	\$	FTE	\$	FTE
1.2.a	Evaluate Stormwater Drainage Systems Est. start date: 10/1/00 Est. finish date: 12/31/04	50	0.10	50	0.10	25	0.10		0.10			125	0.4
1.2.b	Artificial Recharge Project Est. start date: 10/1/00 Est. finish date: 6/1/02	30	0.10									30	0.1
1.2.c	Drain Well Treatment Pilot Est. start date: 10/1/00 Est. finish date: 1/30/05	50	0.10	200	0.10	150	0.10	75	0.10	25	0.10	500	0.5
Total		130	0.30	250	0.20	175	0.20	75	0.20	25	0.10	655	1.0

a. FTE = Full Time Equivalency.

Water Supply Development Recommendations

Recommendation 1.3: Recommendations from the developed wastewater optimization plan should be included by local governments into their own wastewater master plans. Local governments should adopt building codes and land development recommendations requiring proposed new development to construct infrastructure and use water from the reclaimed water system, if this type of reuse is projected in their master plan.

Recommendation 1.4: Utilities should consider supplemental sources and interconnection with other utilities to maximize the volume of reclaimed water reused.

Strategy 2.0: Minimize Floridan Aquifer Drawdown through Reduction of Demands

Comments

The District's water conservation roles consist of a supply management/water resource development function that includes reclaimed water use, and a demand reduction/permitting function. These roles are separated into two strategies in addressing the resource concerns. Reclaimed water is anticipated to be one of the largest alternative sources to be developed in the Central Florida region and is addressed as part of Strategy 1.0. The second component, conservation to promote less water use, is the focus of Strategy 2.0.

Water Resource Development Recommendations

Recommendation 2.1: Develop a comprehensive water conservation program, in conjunction with local utilities, to address irrigation, education and specialty programs

Discussion

Water conservation was given a low ranking by the committee for its small potential contribution to solving the projected water resource concerns. Conservation in agriculture was ranked particularly low because of the expected future reduction in total agricultural acreage in Orange and Osceola counties. Urban water conservation was thought to be adequately addressed under the CUP permitting process and through the state's low-flow plumbing code requirements. Water conservation was estimated to reduce projected demands by 5-10 percent of the projected 90 MGD increase or an estimated 9 MGD.

The advisory committee assisted in identifying areas for improvement in the current conservation activities. The existing CUP could be improved by allowing individual utilities to demonstrate which of the conservation strategies presented in the CUP process are best suited to their utility. These individually tailored conservation strategies would then be enforced for the utility, as opposed to all of the strategies being required for all utilities. A recommendation for improving District enforcement measures was also suggested.

A recommendation for the appointment of two conservation program coordinators is proposed. Under the conservation program coordinators, the District will develop and implement a comprehensive water conservation program. The program will be developed to assist water users in identifying and implementing cost-effective conservation measures and developing new or utilizing existing policies to further public education. This program and position will be implemented Districtwide and focus on urban areas and outdoor uses. The costs presented with this recommendation are Districtwide with the KB Water Supply Plan representing an estimated 25 percent of that total.

Summary of Tasks

Task 2.1.a: The District should appoint two water conservation coordinators. These persons would be responsible for developing a comprehensive water conservation program for the District. The program will be designed to coordinate local government and water management district efforts in water conservation education. This program will look to promote a consistent Districtwide and interdistrict message on water conservation and water shortage, and increase educational benefits through cooperative funding.

Task 2.1.b: The District will encourage and assist in the development of effective water conservation plans for individual public water supply utilities. As part of this program, the District will provide for water use audits for utilities requesting

this service.

1. identifying inefficiencies in water use
2. identifying projects and programs to improve water use efficiency through incentive and regulatory approaches
3. evaluating the effectiveness of various options in meeting the existing and projected needs of the region
4. identifying specific conservation measures that should be incorporated in the updated regional water supply plan

Based upon the audit, recommendations for individually tailored water conservation plans will be made. The recommendations, if adopted, would be considered a means of satisfying a portion of the water conservation requirements for the CUP.

Summary Information

Total Recommendation Cost: \$330,000

Estimated District Participation: \$330,000 FTEs: 1.55

Potential Funding Source: SFWMD and SJRWMD

Implementing Agency: SFWMD, SJRWMD, and local governments

Quantity of Water Made Available: 9 MGD

Table 34. Summary of Estimated Schedule and District Costs for Recommendation 2.1.

Water Conservation Program		Plan Implementation Costs (\$1,000s and FTEs ^a)											
		FY01		FY02		FY03		FY04		FY05		Total	
Task #	Recommendation	\$	FTE	\$	FTE	\$	FTE	\$	FTE	\$	FTE	\$	FTE
2.1.a	Comprehensive Conservation Program Est. start date: 10/1/00 Est. finish date: N/A	60	0.25	60	0.25	60	0.25	60	0.25	60	0.25	300	1.25
2.1.b	Assist in Individual Plan Development Est. start date: 10/1/00 Est. finish date: N/A			10	0.10	10	0.10	10	0.10			30	0.30
Total		60	0.25	70	0.35	70	0.35	70	0.35	60	0.25	330	1.55

a. FTE: Full Time Equivalency.

Strategy 3.0: Optimize use of the Floridan Aquifer and Develop Alternative Sources

Comments

The recommendations under this strategy examine developing alternative water sources that would reduce future dependence on the Floridan aquifer in areas of the greatest projected drawdown. Surface water, reclaimed water, storm water and brackish ground water are identified as possible alternative sources in Central Florida. Reclaimed water and storm water are addressed as part of Strategy 1.0. Recommendation 3.1 proposes an investigation into the availability of the surface water resources, such as lakes, within the basin. In addition, an investigation is proposed for the St. Johns River to determine how this source may provide supplies to entities located within Central Florida. In addition, this strategy looks to optimize the continued use of the Floridan aquifer.

Water Resource Development Recommendations

Recommendation 3.1: Research and Develop Alternative Water Supplies

Discussion

Alternative water source options identified by the advisory committee include reclaimed water, surface water, brackish ground water and additional fresh ground water. Of these alternatives, the use of surface water was given the second highest ranking behind reclaimed water. Surface water sources identified include the Kissimmee River, Kissimmee Chain of Lakes, and Alligator Chain of Lakes, and the St. Johns River. Technical and resource based issues to quantify the availability of these sources were not addressed as part of this planning effort. Integral to determining availability is the establishment of minimum flows and levels (MFLs) and the harm standard.

For those water resources within the SFWMD's boundaries, the SFWMD will take the lead role in the investigation and determination as to how these various alternative supplies will be distributed. Likewise, for those water resources within the SJRWMD, that district will have the lead role in the investigation and determination as to how these various alternative supplies will be distributed. The results of such district investigations should be coordinated, yet not be binding upon either water management district.

Brackish ground water is considered a less viable alternative due to treatment costs and permitting hurdles associated with concentrate disposal. In addition, transport costs associated with the piping of water from locations outside of the basin where access to brackish water occurs make this option less desirable. The surficial aquifer is also not considered a regionally viable option due to very low yields and the high iron content of the water.

Summary of Tasks

Task 3.1.a: For the following surface water bodies, the District should conduct a comprehensive research project to: (1) determine the amount of water available for allocation without causing harm; (2) determine appropriate minimum flows and levels; (3) recommend integration of these minimum flows and levels with the water shortage program; and (4) propose a quantity of water in the Kissimmee River which should be reserved from use under Section 373.223(3), F.S. Each of the research project's recommendations should be implemented after incorporating the same in District rules. The following is a list of the water bodies which should be the subject of this comprehensive research project: Kissimmee River and Lake Kissimmee in 2004, and by 2006 for East Lake Tohopekaliga, Lake Tohopekaliga, Lake Hatchineha, Cypress Lake, Fish Lake, Lake Jackson, Lake Marian, Lake Pierce, and Lake Rosalie.

Task 3.1.b: The District should coordinate with the SJRWMD on the investigation of the St. Johns River as a water supply option for the Central Florida area.

Summary Information

Total Recommendation Cost: \$500,000

Estimated District Participation: \$500,000 FTEs: 5.0

Potential Funding Source: SFWMD

Implementing Agency: SFWMD

Quantity of Water Made Available: N/A

Table 35. Summary of Estimated Schedule and District Costs for Recommendation 3.1.

Research and Develop Alternative Supplies		Plan Implementation Costs (\$1,000s and FTEs ^a)											
		FY01		FY02		FY03		FY04		FY05		Total	
Task #	Recommendation	\$	FTE	\$	FTE	\$	FTE	\$	FTE	\$	FTE	\$	FTE
3.1.a	Surface Water Availability and MFL's Est. start date: 2/1/01 Est. finish date: 6/30/05	100	0.95	100	0.95	100	0.95	100	0.95	100	0.95	500	4.75
3.1.b	Investigation of the St. Johns River	0	0.05	0	0.05	0	0.05	0	0.05	0	0.05	0	0.25
Total		100	1.0	100	1.0	100	1.0	100	1.0	100	1.0	500	5.00

a. FTE: Full Time Equivalency.

Recommendation 3.2: Determine Optimized Use of the Floridan Aquifer**Discussion**

The amount of fresh ground water that is available and the best location for its withdrawal are issues that remain unresolved. A determination of the quantity of the available fresh ground water supplies will require gathering of additional hydrologic data and modeling. The collection of the necessary hydrologic information and development of models to accurately identify resource concerns is recommended to address this issue.

Task 3.2.a: The District, in partnership with local governments and state and federal agencies, will complete hydrologic investigations of the aquifer systems within the basin in support of the development of new or revised ground water modeling tools. Focus of these studies should be on Orange, Osceola and Polk counties and in areas where the risk of harm to the resources is estimated to be the greatest. The total cost of this task is estimated at \$2,900,000.

Task 3.2.b: New or revised ground water models will be developed to make better predictions for the next planning cycle. These models are proposed to be developed in cooperation with the USGS, local governments, and other WMDs. These models should improve the ability of the District to predict the severity of potential resource harm to wetlands, saltwater movement, spring discharges and lakes. In addition, the model will improve the District's ability to establish a MFL for the Floridan aquifer. Part of this evaluation will include an evaluation partitioning the impacts of the differing water management districts on the respective criteria. The total cost of this task is estimated at \$750,000 with the District cost share at 50 percent.

Summary Information

Total Recommendation Cost: \$3,650,000

Estimated District Participation: \$3,275,000 FTEs : 8.25

Potential Funding Source: SFWMD, SJRWMD, SWFWMD, and local government

Implementing Agency: SFWMD, SJRWMD, SWFWMD, and local government

Quantity of Water Made Available: N/A

Table 36. Summary of Estimated Schedule and District Costs for Recommendation 3.2.

Determine Optimized Use of the Floridan Aquifer		Plan Implementation Costs (\$1,000s and FTEs ^a)											
		FY01		FY02		FY03		FY04		FY05		Total	
Task #	Recommendation	\$	FTE	\$	FTE	\$	FTE	\$	FTE	\$	FTE	\$	FTE
3.2.a	Hydrologic Investigation Est. start date: 10/1/00 Est. finish date: 2/1/04	750	1.00	1,000	2.00	700	2.00	350	1.00	100	1.00	2,900	7.00
3.2.b	Ground Water Modeling Est. start date: 2/1/01 Est. finish date: 1/30/05	25	0.25	50	0.25	100	0.25	100	0.25	100	0.25	375	1.25
Total		775	1.25	1,050	2.25	800	2.25	450	1.25	200	1.25	3,275	8.25

a. FTE: Full Time Equivalency.

LAKE ISTOKPOGA-INDIAN PRAIRIE BASIN

The agricultural operations within the Lake Istokpoga-Indian Prairie Basin have experienced a series of water shortages related to a lack of supplies from Lake Istokpoga and runoff from the basin. During the late 1980s and early 1990s, several actions were taken by the District that appear to have corrected these problems. An analysis of the Lake Istokpoga-Indian Prairie system, completed as part of this plan, suggests that although there appears to be sufficient water to meet the current water supply demands, surface water from the Lake Istokpoga-Indian Prairie Basin is not sufficient to meet all of the projected 2020 water needs. The recommendations considered as part of this plan look to develop alternative supplies to meet the projected future need.

Several water resource options were identified and reviewed that would address the projected shortfalls in water supply specific to the Lake Istokpoga-Indian Prairie Basin. The options were divided into the two groups shown in **Table 37**. This table differs from those seen in Chapter 5, that were identified by the advisory committee. Group A are those alternatives that the District believes to show the most potential for development of significant additional supplies or would work to reduce the projected demand deficits found within the Istokpoga Basin. Those options in Group B are expected to yield limited additional supply or reduction of projected demands. The options discussed looked at either making new supplies available or reducing projected demand.

Lake Istokpoga is currently under an effort by the FWC, Highlands County and local residents to restore the environmental function to the lake. These groups advocate development of a continuous management plan for the lake. The first step in their plan includes the environmental drawdown of the Lake Istokpoga to address water quality, fish and wading bird habitat, water supply and flood control problems related to excessive vegetative accumulation. An application for the drawdown has been filed with the U.S. Army Corps of Engineers (USACE), however, the schedule for the drawdown is unknown.

Table 37. Water Source Options for the Lake Istokpoga-Indian Prairie Basin.

Group A^a	Group B^b
Lake Okeechobee backpumping	Increase irrigation efficiency
Changes for minimum operational flows	Regulation schedule/minimum operational level on Lake Istokpoga
Additional pumps to move water above S-82 and S-83 structures	Removal of tussocks from Lake Istokpoga
Regional reservoirs	Water from Kissimmee at G-85
Aquifer storage and recovery	Increasing flows to Lake Istokpoga
Increase use of Lake Istokpoga (during drought)	Surficial Aquifer System
Kissimmee River	Increase canal storage
Additional ground water	Local reservoirs

- a. Group A options: alternatives with the most potential for development of significant additional supplies or would work to reduce the projected demand deficits.
- b. Group B options: alternatives with limited potential for development of significant additional supplies or reduction of projected demands.

Some of those advisory committee members involved in the Lake Istokpoga ecosystem sustainability indicated they could not give their full support to the water supply plan if further use of Lake Istokpoga would be detrimental to the restoration effort. These participants and others of the committee, expressed an interest in meeting all of the future basin demands from Lake Okeechobee as an alternative. However, given the current structure and pumping facilities in place and the wide variety of environmental and human uses dependent upon Lake Okeechobee supplies, it was determined appropriate that only a portion of the basin demands could be met from Lake Okeechobee. Moreover, Lake Okeechobee performs a wide variety of functions which make its management complex. Lake Okeechobee is a water supply source for substantial environmental needs including the Caloosahatchee and St. Lucie estuaries, the Loxahatchee National Wildlife Refuge, the Water Conservation Areas, the Everglades National Park, Biscayne Bay, and Florida Bay. The estimated transfer amount was based upon an evaluation of the projected 1-in-10 drought demands for the lower portion of the basin that could be serviced by existing facilities moving water to the lower pools of the C-40 and C-41 canals.

In addition to Lake Okeechobee as an alternate source, the Kissimmee River, ground water and additional supplies from Lake Istokpoga were identified as potential sources. Studies performed as part of the restoration efforts of the Kissimmee River indicate a difficulty in meeting the success criteria established for the project with the current inflows to the river. Recommendation 3.1, presented earlier, addresses an evaluation on water availability of the Kissimmee River after a sufficient portion of the restoration effort has been completed to determine the success in meeting the project goal criteria and the establishment of an MFL for the river. Recommendations regarding further use of Lake Istokpoga are presented as part of Strategy 6.0.

Water conservation options were identified, but are believed to provide only minimal potential reduction in water use. In this basin, irrigation water not used for crop

growth is collected by the canal system and is made available for the use of others in the basin via these same canals.

Strategy 4.0: Development of Alternative Water Resources

Comments

The alternative water resources identified include obtaining additional water from Lake Okeechobee, the Kissimmee River and additional ground water. Recommendations to make these options available to users in the basin are included as part of this strategy.

Water Resource Development Recommendations

Recommendation 4.1: Develop an Operational Plan for Backpumping from Lake Okeechobee

Discussion

Lake Okeechobee has been identified as the primary alternative resource to Lake Istokpoga. This recommendation examines the utilization of existing pumps G-207 and G-208, and the installation of additional pumps at other structures to deliver water from Lake Okeechobee back into the Indian Prairie Basin. Utilization of such pumps will require the development of a set of operational guidelines defining the circumstances for the pump use, location of new pumps if constructed, District operated structure control, water quality of the source water, water quality discharges from the farms to the canals, agreements with the Seminole Tribe, and operation of gates and pumps not owned by the District among other items. This recommendation proposes development of a plan that addresses these issues.

The advisory committee requested the District look at the installation of additional pumps to move water above the S-82 and S-83 structures. These new pumps would be installed as temporary pumps or permanent pumping facilities that operate on a temporary basis. Under the defined 1-in-10 drought conditions, the use of these proposed additional pumps are not required in order to meet the long-term demands of the basin. An analysis on the availability of surface water indicates that during the defined 1-in-10 drought condition, Lake Istokpoga has sufficient supply to meet the proposed 2020 demands when working in concert with water from Lake Okeechobee supplied by pumps G-207 and G-208. The supply availability from Lake Istokpoga is, however, a concern due to possible irregular seasonal climatic conditions and the proposed restoration efforts for the lake. The additional pumps in this strategy are proposed for temporary use to add to the dependability of the system and for use during drought events and during the proposed lake restoration efforts.

The cost of operation of delivery pumps is estimated at \$60 per hour, based upon the cost of operation of pumps G-207 and G-208. Results of the analysis described in Chapter 4 indicate that the use of pumps G-207 and G-208 is estimated at 2,142 hours of

operation during the 1-in-10 drought condition. Using this approximate number of hours of operation, the cost of the pump operation of pumps G-207 and G-208 would be about \$128,590 annually. The restoration of Lake Istokpoga has environmental, water quality and some water supply benefits. The addition of two pumps has been proposed in support the restoration effort and to deliver water during declared water shortages in the Indian Prairie Basin. Local landowners and the FWC are pursuing this installation of temporary use pumps to deliver water north of the S-83 and S-82 structures pending the outcome of the District-sponsored design and a funding determination. Estimated costs for construction of these pumps is \$2 million to \$3 million, with an additional annual operating cost of about \$60 per hour. Operation of these pumps should be included in the Lake Okeechobee operation plan.

Summary of Tasks

- Task 4.1.a: The District should develop an operational plan for backpumping water from Lake Okeechobee into the Indian Prairie Basin using pumps G-207 and G-208 and any other pumps that might be constructed to move water in the basin. As part of this plan, the District should address operation of existing and proposed pumps, operational agreements with local land owners and the Tribe, water quality TMDLs for Lake Okeechobee, MFLs for Lake Okeechobee and Lake Istokpoga, Lake Okeechobee Protection legislation (HB 991), the Tribe's entitlement rights, canal water levels, land acquisition necessary to effectuate the plan, Lake Istokpoga release and restoration requirements, water shortage conditions, and cost of operation of existing and proposed pumps. Additionally, the operational plan should address any water quality monitoring program which might be necessary to integrate with the agreements described in Task 4.1.b.
- Task 4.1.b: The District should obtain the necessary agreements, or amendments to existing agreements, with local land owners and the Tribe to operate the system in accordance with a operational plan under Task 4.1.a and address basin issues such as water quality, flood control, water supply and environmental concerns. These agreements should establish appropriate partnerships, including party responsibilities and funding for same, with the Tribe and area landowners on the various basin issues.
- Task 4.1.c: The District should pursue the design and determine the operational protocol for new by-pass pumps to deliver water from Lake Okeechobee to points above the S-82 and S-83 structures located the Indian Prairie Basin. This will include evaluating the potential placement of pumps at the S-84 and S-83 structures to remove water from the Kissimmee River below the S65-E Structure as well as other options. These pumps are intended to assure supplies during the Lake Istokpoga restoration efforts and during declared water shortages in the Indian Prairie Basin when water is determined to be available from Lake Okeechobee or the Kissimmee River. The District will evaluate the location and temporary/permanent status of these pumps. Funding for the construction or delivery of these pumps is proposed to be

resolved as part of a future design and funding determination. Operation of these pumps should be included under the operational plan developed. Annual operation of these pumps is estimated at \$100,000 annually during the restoration effort or 1-in-10 drought event.

Task 4.1.d: The District agrees to assist the Tribe in assuring that the change in quality of water delivered does not create compliance issues or an undue regulatory burden on the Tribe. Such assistance may include, but is not limited to, development of the master operational plan, undertaking water quality studies and other appropriate actions as may be agreed upon by the parties.

Task 4.1.e: Nothing in these recommendations, however, is intended to modify the District or Tribe's rights, from that set forth in an Agreement dated November 30, 1992 entitled "Agreement Between the South Florida Water Management District and the Seminole Tribe of Florida and Water Supply Plan for the Brighton Reservation Implementing Section VI. B. of the Water Rights Compact and Subparagraph 3.3.3.2.A.3 of the Criteria Manual (Agreement No. C-4121)," unless and until such modification is specifically agreed to in writing by the Parties.

The District should track the progress of the USEPA and FDEP in finalizing the load standard (TMDLs) to be set on Lake Okeechobee.

Summary Information

Total Recommendation Cost: \$170,000

Estimated District Participation: \$170,000 FTEs : 2.3

Potential Funding Source: SFWMD

Implementing Agency: SFWMD

Quantity of Water Made Available: 41.0 MGD (annualized)

Table 38. Summary of Estimated Schedule and District Costs for Recommendation 4.1.

Okeechobee Backpumping Plan		Plan Implementation Costs (\$1,000s and FTEs ^a)											
		FY01		FY02		FY03		FY04		FY05		Total	
Task #	Recommendation	\$	FTE	\$	FTE	\$	FTE	\$	FTE	\$	FTE	\$	FTE
4.1.a	Develop Operational Plan Est. start date: 10/1/00 Est. finish date: 12/31/03	0	0.20	0	0.20	0	0.10	0	0.10			0	0.60
4.1.b	Obtain Operational Agreements Est. start date: 10/1/00 Est. finish date: 6/1/03	0	0.30	0	0.30	0	0.20					0	0.80
4.1.c	Design and Locate Additional Pumps ^b Est. start date: 10/1/00 Est. finish date: 12/31/01	60	0.25	20	0.25	20	0.00	20	0.00	20	0.00	140	0.50
4.1.d	Assist Tribe with Water Quality Est. start date: 10/1/00 Est. finish date: 5/1/02	10	0.10	10	0.10							20	0.20
4.1.e	Follow TMDLs for Lake Okeechobee Est. start date: 10/1/00 Est. finish date: 2/1/02	0	0.10	0	0.10							0	0.20
Total		70	0.95	30	0.95	30	0.30	20	0.10	20	0.00	170	2.30

a. FTE: Full Time Equivalency.

b. Assumes annual operating cost of \$20,000 for new pumps (\$100,000/5 yrs); pump capital costs to be resolved during design and funding task.

Recommendation 4.2: Investigate the Availability of Water from the Kissimmee River

Discussion

The use of the Kissimmee River has been identified as a potential new source of water for the basin. The availability of water from the Kissimmee River is a question that was left unresolved under this plan. The District has a current \$480 million dollar restoration project underway for the river with established hydrologic success criteria. A determination of the availability of water from the river is necessary. A study is recommended to determine the amount of water that should be reserved from use for the purpose of river restoration. Further, the study should recommend withdrawal amounts which would cause harm and propose minimum flows and levels.

Summary of Tasks

Task 4.2.a: The District should conduct a comprehensive research project to determine the amount of water required for reservation for the Kissimmee River, that water available from the river for allocation without causing harm, and

establish a MFL for the river.

Task 4.2.b: Propose a quantity of water in the Kissimmee River that should be reserved from use under Section 373.223(3), F.S.

Summary Information

Total Recommendation Cost: \$150,000

Estimated District Participation: \$150,000 FTEs: 1.5

Potential Funding Source: SFWMD

Implementing Agency: SFWMD

Quantity of Water Made Available: N/A

Table 39. Summary of Estimated Schedule and District Costs for Recommendation 4.2.

Investigation of Kissimmee River		Plan Implementation Costs (\$1,000s and FTEs ^a)											
		FY01		FY02		FY03		FY04		FY05		Total	
Task #	Recommendation	\$	FTE	\$	FTE	\$	FTE	\$	FTE	\$	FTE	\$	FTE
4.2a	Investigate Availability of Kissimmee River Est. start date: 10/1/04 Est. finish date: 5/1/05	0	0.00	0	0.00	0	0.00	100	0.50	50	0.50	150	1.00
4.2.b	Reservation of Water Est. start date: 11/01/04 Est. finish date: 7/1/05	0	0.00	0	0.00	0	0.00	0	0.25	0	0.25	0	0.50
Total		0	0.00	0	0.00	0	0.00	100	0.75	50	0.75	150	1.50

a. FTE: Full Time Equivalency.

Water Supply Development Recommendations

Recommendation 4.3: Increase Use of Ground Water

Discussion

Ground water is used extensively in the Lake Istokpoga-Indian Prairie Basin as a source for citrus and other crops. Based upon the modeling analysis completed as part of this planning effort, there appears to be ample ground water within this basin for the 2020 planning horizon. Water wells installed in this area yield good quantities of water. Concentrations of chlorides and sulfur appear to be high, but not prohibitive for most agricultural activities if proper irrigation techniques are used.

The reliability of Lake Istokpoga and Lake Okeechobee as water supply sources has come in question under this evaluation. Concerns on the availability of water during drought events that exceed the defined 1-in-10 event are warranted. Ground water wells are recommended for installation as a back-up source during those times when surface water becomes unavailable. Cost of these wells are estimated at \$150,000 per well, with an operating cost of about \$0.06 per 1,000 gallons.

Summary of Tasks

Task 4.3.a: The District will encourage individual agricultural operations to install Floridan aquifer wells as a back-up supply source in the event of a drought event greater than 1-in-10 condition.

Strategy 5.0: Develop a Water Management Plan for the Lake Istokpoga-Indian Prairie Basin

Comments

This strategy evaluates the lifting of the current moratorium on the use of additional surface water from the Indian Prairie Basin. The primary source of water made available for this purpose will come from water held in storage in Lake Istokpoga above its current minimum operational level. Before the moratorium on the Indian Prairie system can be completely lifted, several items must be addressed in order to assure long-term dependability of the supply source. Among these items are the current regulation and minimum operation schedules, and the MFL for the lake.

Water Resource Development Recommendations

Recommendation 5.1: Develop a Water Management Plan for the Lake Istokpoga-Indian Prairie Basin

Discussion

This recommendation option received the largest amount of discussion from the advisory committee. The committee identified the current restoration efforts of Lake Istokpoga as a high priority and expressed their desire to see no further additional supplies taken from the lake. Some of the advisory committee members involved in the Lake Istokpoga restoration effort indicated they could not give their full support to the water supply plan if further use of the lake would be detrimental the restoration effort. The Florida Wildlife Commission (FWC), Highlands County and several local lake support groups have been involved in an effort to have a drawdown and tussock removal completed on the lake. The drawdown is expected to reduce the amount of total phosphorus from the lake. Lake Istokpoga is identified as an uncontrolled source in the Lake Okeechobee Action Plan.

The availability analysis performed on Lake Istokpoga indicates that under the defined 1-in-10 drought condition, some additional water could be released without levels in the lake dropping below the minimum operation level. This analysis is predicated on using the existing regulation schedule and the minimum operation schedule set for the lake. Both of these items have been identified for review as part of the implementation of the Restudy, and therefore bring into question the future availability and reliability of supply from the lake. In addition, an MFL that considers environmental issues needs to be established for Lake Istokpoga. Recommendations regarding the future use of additional supplies from Lake Istokpoga are pending consideration of the recommended changes on regulation and minimum operational schedules and the setting of a revised MFL for the lake. Future use of this lake will also require lifting the existing moratorium on its use.

The analysis completed under this plan focuses on meeting the supply demands under a 1-in-10 drought condition. Under this condition, additional releases from Lake Istokpoga are anticipated. During less severe drought conditions, the demands for additional releases from Lake Istokpoga are anticipated to be less than those identified in the 1-in-10 drought analysis. This is true due to the reduction in the demand from the 1-in-10 drought and the increase in water storage/runoff in Lake Istokpoga over the drought condition. Under average climatic conditions, the water released from the Lake Istokpoga, under the current operation management guidelines and that collected from runoff in the basin, appears sufficient to meet the average water supply demands for the year 2020. The average condition analysis was completed and presented in Chapter 4, and assumes no change in the current operation management guidelines. This conclusion presumes that use of the current and proposed Lake Istokpoga releases are properly managed in conjunction with the supplies delivered to this basin from Lake Okeechobee. Development of an operational plan to address this and other management issues is the recommendation under Strategy 5.0.

Historically, the range of seasonal water fluctuations on Lake Istokpoga were greater than they are today. Many feel the reduction in fluctuation has contributed to an increase in nuisance vegetation found in the lake. The current operation of the S-68 Structure by the District has controlled the mean lake water level above the minimum operation schedule. This is depicted in **Figure I-1** in Appendix I. This water storage is the source of the projected additional releases from Lake Istokpoga during the 1-in-10 drought. The release of this additional water from storage in the lake, may in fact improve the range of lake fluctuation once every 10 years.

In addition to the prospective water supply issues on Lake Istokpoga, several flood control problems have persisted since the completion of the C&SF project works. Problems include discharge restrictions due to design deficiencies at S-68, S-82, and S-83; the deteriorated state of the G-85 Structure in the Istokpoga Canal; and the overflow of County Road 621. Also, prior efforts of the C&SF Project did not consider the effects of the Kissimmee River Restoration project on existing structures in the Lake Istokpoga drainage basin. As an effort independent of the water supply plan, the District has a proposed project outlined in the Comprehensive Review Study to modify the Lake Istokpoga Regulation Schedule (OPE). The project would (1) identify modifications or additions to the Lake Istokpoga Basin project works to reduce flooding in the basin and

(2) address water resource problems in the Lake Istokpoga Basin. The major focus of this project is to create a balance between the environmental needs, water supply and flood control issues for the Lake Istokpoga Basin. This effort strives to examine the regulation schedule on Lake Istokpoga with a view towards enhancing fish and wildlife benefits, navigation and water supply needs through development of a long-term comprehensive management plan.

As part of Recommendation 5.1, a review of the District's Water Shortage Rule, 40E-22, F.A.C. is proposed. This rule establishes prescribed total monthly minimum flows through the lower structures S-71, S-72, S-84, S-127, S-129, and S-131. This review would be directed at reducing amount to be discharged from the Indian Prairie Basin. The annual total discharge required under 40E-22, F.A.C. is 37,710 ac/ft.

Although water conservation for agricultural is not expected to yield significant reductions in demand, District agricultural conservation efforts will continue through implementation of its water use permitting program. Through the regulatory program efforts are made to: 1) identify inefficiencies in water use; 2) evaluate the effectiveness of various options in meeting the existing and projected needs of the region; 3) make recommendations on specific conservation measures that should be incorporated and require these through the permitting effort.

Summary of Tasks

Task 5.1.a: The District should work with the USACE in revising the operational plan for Lake Istokpoga and the Indian Prairie system. This work is proposed to be conducted as part of the Comprehensive Everglades Restoration Plan (CERP). The revisions to the operational plan should consider the following:

- Revisions to the regulation and minimum operation schedules
- Established MFL for Lake Istokpoga and minimum levels in the canal system
- Minimum flow requirements through the lower structures (S-71, S-72, and S-84)
- Operational plan for backpumping water from Lake Okeechobee
- Evaluation of the effects of revisions to the regulation schedule on surrounding lakes
- Development of a long-term management plan for Lake Istokpoga

Task 5.1.b: The District should evaluate the need for the minimum operation flow requirements under 40E-22 and modify them accordingly. Pending the results of the study, the District should initiate rulemaking efforts to modify Chapter 40E-22, F.A.C., to incorporate the revised flows. Results of the effort should be included in the revised operational plan.

Task 5.1.c: The District should complete the technical work on establishing a MFL for Lake Istokpoga no later than 2003.

Summary Information

Total Recommendation Cost: \$442,000

Estimated District Participation: \$400,000 FTEs: 1.4

Potential Funding Source: SFWMD (CERP) and USACE

Implementing Agency: SFWMD (CERP) and USACE

Quantity of Water Made Available: Preliminary estimate is 15.2 MGD

Table 40. Summary of Estimated Schedule and District Costs for Recommendation 5.1.

Develop Operational Plan for Lake Istokpoga-Indian Prairie Basin		Plan Implementation Costs (\$1,000s and FTEs ^a)											
		FY01		FY02		FY03		FY04		FY05		Total	
Task #	Recommendation	\$	FTE	\$	FTE	\$	FTE	\$	FTE	\$	FTE	\$	FTE
5.1a	Revise Operational Plan for Lake Istokpoga Est. start date: 10/1/00 Est. finish date: 2/1/05	100	0.20	100	0.10	100	0.10	0	0.10	0	0.10	300	0.60
5.1.b	Evaluate Minimum Flow Requirements Est. start date: 10/1/01 Est. finish date: 2/1/03	0	0.10	0	0.10	0	0.10					0	0.30
5.1.c	Complete MFL Technical Work Est. start date: 10/1/01 Est. finish date: 3/1/03			50	0.25	50	0.25					100	0.50
Total		100	0.03	150	0.45	150	0.45	0	0.10	0	0.10	400	1.40

a. FTE: Full Time Equivalency.

Recommendation 5.2: Evaluate Regional Storage

Discussion

This option considers creation of a regional water storage system such as a reservoir or ASR. The benefits of a reservoir include storm water attenuation, water quality treatment and dry season storage. The benefits of ASR are primarily drought attenuation. The location of such a reservoir could be north or south of Lake Istokpoga, although the maximum benefit for water quality treatment could be achieved south of the lake.

Recommendations published in an April 1999 report on the Central and South Florida Comprehensive Restudy Project call for the construction of a storage reservoir to be located north of Lake Okeechobee and within the KB Planning Area. The location of this reservoir is identified for Glades, Highlands, or Okeechobee counties. The CERP effort proposes to investigate the location of a reservoir north of Lake Okeechobee in 2011. The advisory committee recommended that the District pursue a reservoir for the Indian Prairie Basin at that time. A recommendation for placement of this reservoir in the Indian Prairie Basin is included within the five-year costs estimates presented in this plan in the event that installation of this reservoir accelerated beyond its current schedule.

In addition, a draft study recently completed by CH2M Hill (2000) for the SWFWMD identified a possible project for aquifer recharge located near Lake Istokpoga. The project, as currently proposed, identifies the injection of surface water for a goal of restoring aquifer levels along the Lake Wales Ridge. Discussions with the SWFWMD indicate they may be interested pursuing a ASR facility at this location to store and return water from Lake Istokpoga. Targeted water would be above the regulation schedule normally released to Lake Okeechobee.

Summary of Tasks

Task 5.2.a: Enter into an agreement with SWFWMD to conduct a feasibility assessment on an ASR type facility on or near Lake Istokpoga. The District should work with the SWFWMD to assess the potential for interdistrict transfers of water. The estimated cost of additional studies is \$300,000.

Task 5.2.b: The District will review the potential for placing the regional storage reservoir, identified in the Restudy to be located north of Lake Okeechobee, in a location that may assist in supplying water to the Indian Prairie Basin. The timing of this review will be coordinated with the implementation of the CERP effort.

Summary Information

Total Recommendation Cost: \$300,000

Estimated District Participation: \$150,000 FTEs: 0.4

Potential Funding Source: SFWMD, SWFWMD, FDEP and local government

Implementing Agency: SFWMD and SWFWMD

Quantity of Water Made Available: Estimated at 3 MGD

Table 41. Summary of Estimated Schedule and District Costs for Recommendation 5.2.

Evaluation of Regional Storage		Plan Implementation Costs (\$1,000s and FTEs ^a)											
		FY01		FY02		FY03		FY04		FY05		Total	
Task #	Recommendation	\$	FTE	\$	FTE	\$	FTE	\$	FTE	\$	FTE	\$	FTE
5.2.a	Lake Istokpoga ASR Est. start date: 1/1/02 Est. finish date: 6/30/04			50	0.10	50	0.10	50	0.10			150	0.30
5.2.b	North of Lake Reservoir Est. start date: 10/1/02 Est. finish date: 11/30/03				0.05		0.05						0.10
Total				50	0.15	50	0.15	50	0.10			150	0.40

a. FTE: Full Time Equivalency.

RELATED STRATEGIES

The District is also considering the following strategies to implement the KB Water Supply Plan. These strategies address coordination among the water management districts and consistency between planning and permitting.

Strategy 6.0: Coordination Among Water Management Districts

The location and nature of the KB Planning Area warrants intensive coordination with adjacent water management districts, particularly in water resource investigation, water resource planning, water resource regulation, and water shortage declarations. To better coordinate these activities, the three water management districts have entered into a Memorandum of Understanding (MOU), which outlines guidelines for coordination in each of these four areas. In addition, the District's participate in several other less formalized, but still organized cooperative efforts. Among these are (1) the Water Planning Coordination Group (WPCG), which includes members of the five water management districts and the DEP to deal with consistency on planning issues; (2) the Interdistrict Framework Group, which looks at consistency in the determination of MFLs; and (3) the Inter-District Irrigation Water Use Working Group, which looks to arrive at consistent methods of determining agricultural water use projections.

A constant theme in the development of this plan is that the impacts of withdrawals in one District may affect the water resources in another District. A recommendation is made for the SFWMD, SJRWMD, and the SWFWMD to continue coordination efforts in water resource planning and that this coordination be continued through the MOU and other working groups established between the districts.

A recommendation of the plan is the continuing hydrologic investigations and the development of an improved modeling effort covering Central Florida. Limited hydrologic information and steady-state modeling tools restricted the degree to which the analyses could predict harm to the resource criteria. The recommendation is to complete

additional hydrologic investigations and develop new modeling tools to improve the accuracy of future predictions. These modeling tools will also be used in determining optimal use of reclaimed, storm water, and continued Floridan aquifer sources.

The District will coordinate the implementation of the KB Water Supply Plan with local governments/utilities, the Lower East Coast Water Supply Plan, the Comprehensive Everglades Restoration Plan, the C&SF Comprehensive Review Study, and other related efforts to promote compatibility. In addition, the implementation of the KB Water Supply Plan will address the recommendation in the Upper East Coast Water Supply Plan concerning activities in the KB Planning Area that could have a negative impact on recharge to the Floridan aquifer in the UEC Planning Area.

As to all recommendations contained within this Plan concerning coordinated efforts, the Governing Board specifically intends to retain its authority under Chapter 373, F.S., to make independent decisions based upon the outcome of this coordinated effort, as the plan is implemented. Nothing herein interferes with the authority of the SFWMD Governing Board to set water policy for the region within its jurisdiction.

Recommendation 6.0: The SFWMD will coordinate with the SJRWMD, SWFWMD and the FDEP for the purpose of maximizing consistent criteria and approaches concerning the following:

- Consistent resource protection criteria
- Hydrologic investigations
- Improved hydrologic modeling
- Local sources first
- Minimum flows and levels
- Water shortage declarations

Summary Information

Total Recommendation Cost: \$0

Estimated District Participation: \$0 FTEs 1.0

Potential Funding Source: SFWMD

Implementing Agency: SFWMD, SJRWMD, and SWFWMD

Quantity of Water Made Available: N/A

Table 42. Summary of Estimated Schedule and District Costs for Recommendation 6.0.

Inter-DistrictCoordination		Plan Implementation Costs (\$1,000s and FTEs ^a)											
		FY01		FY02		FY03		FY04		FY05		Total	
Task #	Recommendation	\$	FTE	\$	FTE	\$	FTE	\$	FTE	\$	FTE	\$	FTE
6.0	Inter-District Coordination Est. start date: Immediate Est. finish date: None	0	0.20	0	0.20	0	0.20	0	0.20	0	0.20	0	1.00
Total		0	0.20	0	0.20	0	0.20	0	0.20	0	0.20	0	1.00

a. FTE: Full Time Equivalency.

Strategy 7.0: Consistency Between Planning and Water Use Permitting

The KB Water Supply Plan addresses various supply and demand parameters that serve to define the quantity of water that is available for allocation. These parameters are appropriate for use in the CUP Program. Additional KB Water Supply Plan parameters related to environmental and water shortage are also appropriate for rulemaking and are related to the District's overall water management program, beyond CUP Program considerations. Thus, the plan recommends rulemaking for the purpose of incorporating salient portions of this WSP in the CUP Program and other components of District's overall water supply management scheme. Among these issues are:

- Level of certainty
- Resource protection criteria
- Cumulative analysis
- Water shortage triggers
- Permit duration
- Minimum flows and levels
- Special Designation Area amendments, including Restricted Allocation Areas
- Local sources first

The District currently has consumptive use rulemaking efforts underway to address these topics for the KB Water Supply Plan, as well as the three other water supply plans also under development. The following is a brief explanation of these rulemaking areas:

Level of Certainty - Incorporate the 1-in-10 drought planning level goal into the CUP allocation and impact assessment criteria.

Resource Protection Criteria - Update the wetlands protection, saline water intrusion and movement of contaminate criteria.

Cumulative Analysis - Incorporate requirements of ground water modeling approaches, including cumulative impact, into the CUP rules.

Water shortage triggers - Update the water shortage requirements and triggers into the CUP rules.

Permit Duration - Concern was expressed by the advisory committee on the issuance of consumptive use permits (CUP) for a period of 20 years in areas where the potential resource impacts remain unresolved. In the Orange-Osceola County Area, several concerns have been raised about the availability of the Floridan aquifer for future demands. This effort considers issuance of permits for durations less than 20 years for the additional use of Floridan aquifer water in portions of the northern planning basin.

Minimum Flows and Levels - Incorporate a process for adopting MFLs into the District rules. Section 373.0421, F.S. requires that once the MFL technical criteria have been established, the District must develop a recovery and prevention strategy for those water bodies that are expected to exceed the proposed criteria. Planning and regulatory efforts will include a programmed recovery process that will be implemented, where necessary, over time to improve water supply and distribution to protect water resources and functions.

Restricted Allocation Areas - The Lake Istokpoga-Indian Prairie system currently has a moratorium on additional surface water use in the District rules. This effort considers a rulemaking effort to lift the moratorium and to what degree.

Local Sources First - This planning process does not specifically evaluate the feasibility of implementing any identified water supply solutions based on “local sources first” criteria. Further, the District has not identified the water supplied by the Central and Southern Flood Control Project. Before any selected option can be permitted, “local sources first” criteria, as appropriate, must be addressed by permit applicants. Additionally, this rulemaking effort will consider technical implementation considerations related to application of the statutory criteria.

Recommendation 7.0: Continue Rulemaking Efforts

Discussion

The District will conduct a public rulemaking process in accordance with Chapter 120, F.S. for the purpose of incorporating salient portions of this Plan in the CUP Program and other components of District’s overall water supply management program.

Summary of Tasks

Task 7.0.a: Continue ongoing rule development and rulemaking.

Task 7.0.b: The District should consider granting 20-year permits for currently demonstrated uses of fresh ground water from the Floridan aquifer in areas

where it has been demonstrated to be available. The District should consider not granting 20-year permits in Orange, Osceola and Polk counties for additional uses of fresh ground water from the Floridan aquifer beyond the demonstrated withdrawals at the time of permit renewal.

Task 7.0.c: The District should consider rulemaking for the purpose of lifting the moratorium identified in 3.2.1(A) of the Basis of Review for Water Use Permitting for the Lake Istokpoga-Indian Prairie system after addressing the issues discussed in Recommendation 4.1. The revised level of allocation should be equal to the amount determined to be the combined discharge through the structures S-71, S-72, and S-84 during a defined 1-in-10 drought event and the amount of water delivered to the basin through pumps G-207 and G-208, as determined by the evaluation performed under the KB Water Supply Plan. The breadth of tasks detailed in Recommendation 4.1 necessitates an internal work effort as well as detailed negotiation/coordination efforts with area stakeholders. Given the necessity to comprehensively integrate the interests of all area stakeholders with the master operational plan, it is difficult to specifically schedule tasks that will ultimately result in this rulemaking effort. The District's goal is to accomplish the necessary tasks within a two-year period and prior to the expiration of water use permits within the basin.

Task 7.0.d: The District should continue with its research and rulemaking efforts in developing and adopting a wetlands resource protection criteria.

Task 7.0.e: The District should complete a hydrologic investigation to further refine the relationship between water levels, geologic conditions and the formation of sinkholes. Results of this, and existing studies will be the basis for future rulemaking efforts on sinkholes.

Summary Information

Total Recommendation Cost: \$40,000

Estimated District Participation: \$40,000 FTEs 2.2

Potential Funding Source: SFWMD

Implementing Agency: SFWMD

Table 43. Summary of Estimated Schedule and District Costs for Recommendation 7.0.

Rulemaking		Plan Implementation Costs (\$1000s and FTEs ^a)											
		FY01		FY02		FY03		FY04		FY05		Total	
Task #	Recommendation	\$	FTE	\$	FTE	\$	FTE	\$	FTE	\$	FTE	\$	FTE
7.0.a	Incorporation into the District's CUP Program through rulemaking Est. start date: 11/1/00 Est. finish date: N/A	0	0.20	0	0.20	0	0.20	0	0.10	0	0.10	0	0.80
7.0.b	20 Yr. Permits Rulemaking Est. start date: 10/1/00 Est. finish date: 2/2/02	0	0.10	0	0.10							0	0.20
7.0.c	Lift Moratorium Est. start date: 6/30/01 Est. finish date: 12/30/02	0	0.30	0	0.20	0	0.20					0	0.80
7.0.d	Resource Protection Criteria Rulemaking Est. start date: 10/1/01 Est. finish date: 4/1/03			0	0.10	0	0.10					0	0.20
7.0.e	Sinkhole Study and Rulemaking Est. start date: 10/1/01 Est. finish date: 6/30/04			20	0.20	20	0.10	0	0.10			40	0.40
Total		0	0.60	20	0.80	20	0.60	0	0.10	0	0.10	40	2.20

a. FTE: Full Time Equivalency.

RELATIONSHIP OF PROJECTS TO FIVE-YEAR WORK PROGRAM

The purpose of the Five-Year Water Resource Development Work Program (Five-Year Work Program) is to report the District's progress in implementing recommendations once the KB Water Supply Plan is approved by the Governing Board. The time frame for the work program will be 2001-2005. For each recommendation or strategy, the work program will provide the following information:

- The total cost of the project
- An estimate of the amount of water to become available by implementation of the project
- Funding source
- Implementing agency
- A summary of any changes to the recommendation since the plan was implemented
- Timetables for the Five-Year Work Program

In anticipation of developing a work program after Governing Board approval of the KB Water Supply Plan, the recommendations under the water resource development component of this plan incorporate the work program information listed above. This will facilitate the writing of the work program, which is anticipated to begin in mid-2001.

FUNDING

This section addresses the funding strategy and options for implementation of this Water Supply Plan. The approach takes into account the requirements of Chapter 373, F. S., feedback and comments from the advisory committee, and input from District staff. Chapter 373 requires water supply plans to include a funding strategy that is reasonable and sufficient to pay the costs of constructing or implementing all of the recommended projects.

In general, the funding approach is divided into two major categories: water resource development and water supply development. The water resource development category addresses funding for projects that are primarily the responsibility of the District. Water supply development projects, on the other hand, are primarily the responsibility of local governments, utilities, and other water users. However, information is included on programs that target funding of water supply development projects in general.

Water Resource Development

Water resource development projects are generally regional in nature and are primarily the responsibility of the District. The water resource development projects for the Planning Area were itemized earlier in this chapter. In addition, pursuant to Chapter

373, F.S., each water management district governing board is required to include in its annual budget the amount needed for the fiscal year to implement water resource development projects, as prioritized in its regional water supply plans. In addition to this Plan, the District is also completing regional water supply plans for two other planning areas while approaching the third year of implementation of the Upper East Coast Water Supply Plan.

Besides implementation of the water supply plans, the SFWMD is initiating implementation of the \$8 billion Comprehensive Everglades Restoration Plan (CERP), a cost-shared effort with the USACE. It is anticipated significant District financial resources will be used for this project. It is not known to staff at this time the impact that these efforts will have on the District's resources in the future. Consequently, timelines for implementation of the plan recommendations may have to be adjusted in the future. Any future changes to these timelines will be identified in the annual updates to the District's Five-Year Water Resource Development Work Plan. The recommendation tables in the KB Water Supply Plan show the costs of the projects and potential sources of funding. Timeframes for specific plans are preliminary and are subject to funding availability in future years.

Total cost of the water resource development projects for this Plan is \$11.217 million over the course of the next five years. The traditional funding source for these types of projects has been primarily ad valorem taxes. Non-CERP projects, most of those listed in this Plan, will be ranked and prioritized along with projects in all other regional water supply plans during annual District budget preparation, and funded as money is available. Priority considerations for a project include availability of a cost-share partner and if a project makes "new" water available. Sustainability of the regional system is also an important consideration of project prioritization.

Some of the recommendations in this Plan are studies. These studies may result in construction projects at a later date. Funding associated with these will be addressed at that time. Potential funding sources for water resource development include funds provided on a project-by-project basis by the SFWMD's budget.

Water Supply Development

Water supply development projects are local in nature and generally involve the withdrawal, treatment, and distribution of water. Chapter 373 states that, "local governments, regional water supply authorities, and government-owned and privately owned water utilities take the lead in securing funds for and implementing water supply development projects. Generally, direct beneficiaries of water supply development projects should pay the costs of the projects from which they benefit, and water supply development projects should continue to be paid for through local funding sources." It is not the intent that regional water supply plans mandate actions to be taken by local agencies, utilities, and other water users. Therefore, the overall theme of this section is to provide direction and assistance, but not to mandate directives to local governments or utilities.

Chapter 373 requires water supply plans to identify potential sources of funding for water supply development projects. In addition to funding the projects themselves through utility rates, there are several other funding programs to assist local entities.

Water Resource Protection and Restoration Projects Funding Program

On January 18, 2000, Governor Jeb Bush announced his proposal to finance the protection and preservation of Florida's water resources. The Governor's proposed budget provides \$73 million dollars to fund water resource restoration projects, which include wastewater treatment plant upgrades and stormwater treatment areas. This represents an increase of 38 percent over last year's water project funding.

Projects eligible for the funding must address such criteria as resolving violations of state water quality standards, preventing drainage and flood control problems, and resolving public health threats. Projects requesting funding for surface water restoration and wastewater improvements will be reviewed by the Water Advisory Panel to ensure eligibility.

The Governor created the Water Advisory Panel to ensure that efforts to protect and preserve Florida's water resources is priority-driven, objective, and policy-based. Projects determined by the panel as meeting the criteria will be forwarded to the legislature for funding consideration. This process ensures that state dollars are providing needed and meaningful improvements to state water resources.

The featured project must be identified in a Water Management District or Florida Department of Environmental Protection plan as part of a surface water restoration effort. In addition, stormwater related restoration projects that have a flood component must be identified in a stormwater mitigation master plan and have quantifiable flood protection targets. For wastewater facilities projects, grant recipients must have or agree to adopt an ordinance requiring mandatory waste management hookup upon failure of individual systems. The sponsor, or recipient, of the wastewater facilities projects is expected to fund at least 25 percent of the total project costs.

District's Alternative Water Supply Grant Program

The District's Alternative Water Supply Grant Program was codified in statute by the Florida Legislature in 1995 to increase the potential for the development of alternative water supplies in the state; assist utilities in developing cost-effective reclaimed water supplies; and fulfill a public purpose to fund such programs. Since FY97, the District has funded 82 projects in its Water Resource Caution Areas for a total of approximately \$20 million.

The Alternative Water Supply Funding Program is a cost-share program and requires a project's sponsor to provide a portion of the funding for the project. The District publishes guidelines for implementing this program that are consistent with the statutory language provided below. These guidelines address the application and review process, ranking criteria, and the time frame for implementation.

To be considered for this funding support, the project must be consistent with the local government plan and must be located in a water resource caution area. The local government must require all appropriate new facilities within the project service area to connect and use the project's alternative water supplies. Funding support shall be applied only for the capital or infrastructure costs for the construction for alternative water supply systems and the project must fall within guidelines established by the district.

Projects are scored and ranked by a selection committee of non-SFWMD representatives from utilities, the environment, and agricultural interests. They score and rank submitted project proposals based on criteria from the enabling legislation, the SFWMD, and the Water Resources Development Act, described earlier. It is also recommended that the Alternative Water Supply Grant committee give high ranking to projects that involve data collection that support recommendations in this plan, such as Floridan aquifer storage hydraulic data collection when constructing Floridan wells for ASR or as a PWS source.

Drinking Water State Revolving Fund Program

The 1996 Amendments to the Safe Drinking Water Act (SDWA) authorized USEPA to award grants to states for capitalization of Drinking Water State Revolving Funds (DWSRF). These are intended to be a source of financial assistance to public water systems to achieve compliance with Drinking Water Regulations and protecting public health. States must provide matching funds equal to at least 20 percent of the grant.

There are two elements of a DWSRF. The first element is establishment of a loan fund enabling a state to make below-market loans to public water systems for the construction of projects. (A PWS can be publicly or privately-owned but some states have statutory or constitutional restrictions limiting funding for privately-owned systems.) States must adopt a priority system, ranking projects based on considerations of public health, compliance and affordability (systems most in need), and are required to fund to the maximum extent practical in priority order.

The second element of a DWSRF is the ability to provide set-aside money to assist PWSs in meeting regulatory requirements through direct assistance, loans, and/or state grants funding capacity development, source water assessment, source water protection, and operator certification.

SUMMARY OF RECOMMENDATIONS

Table 44 provides a summary of the water resource development recommendations and the District associated costs over the next five years. The total estimated costs to implement the KB Water Supply Plan are \$10.402 million, with the District's share of \$7,395 million.

Table 44. Summary of Estimated Schedule and District Costs for Water Resource Development Recommendations.

Strategies and Recommendations		Plan Implementation Costs (\$1,000s and FTEs)											
		FY01		FY02		FY03		FY04		FY05		Total	
		\$	FTE	\$	FTE	\$	FTE	\$	FTE	\$	FTE	\$	FTE
Orange-Osceola County													
Strategy 1.0 Minimize Floridan Aquifer Drawdown through Recharge													
1.1	Develop a regional reclaimed water optimization plan	345	0.20	820	0.30	300	0.30	210	0.45	50	0.35	1,725	1.60
1.2	Develop a storm water reuse plan	130	0.25	280	0.25	175	0.20	75	0.20	25	0.10	655	1.00
Strategy 2.0 Minimize Floridan Aquifer Drawdown through Demand Reduction													
2.1	Develop a comprehensive water conservation plan	60	0.25	70	0.35	70	0.35	70	0.35	60	0.25	330	1.55
Strategy 3.0 Research and Develop Alternative Sources													
3.1	R & D Alternatives Sources	100	1.00	100	1.00	100	1.00	100	1.00	100	1.00	500	5.00
3.2	Optimize Use of Floridan Aquifer	775	1.25	1,050	2.25	800	2.25	450	1.25	200	1.25	3,275	8.25
Lake Istokpoga-Indian Prairie Basin													
Strategy 4.0 Develop Alternative Resources													
4.1	Develop an operation plan for backpumping from Lake Okeechobee	70	0.95	30	0.95	30	0.3	20	0.10	20	0	170	2.30
4.2	Investigate availability of water from Kissimmee River	0	0.00	0	0.00	0	0.00	100	0.75	50	0.75	150	1.50
Strategy 5.0 Develop Water Management Plan for Lake Istokpoga													
5.1	Develop Water Management Plan for Lake Istokpoga	100	0.30	150	0.45	150	0.45	0	0.10	0	0.10	400	1.40
5.2	Evaluate ASR regional storage			50	0.15	50	0.15	50	0.10			150	0.40
Related Strategies													
Strategy 6.0 WMD Coordination													
6.1	WMDs coordinate on protection criteria development	0	0.20	0	0.20	0	0.20	0	0.20	0	0.20	0	1.00
Strategy 7.0 Continue Rulemaking Efforts		0	0.60	20	0.80	20	0.60	0	0.10	0	0.10	40	2.20
Total		1,580	5.00	2,570	6.70	1,695	5.80	1,075	9.60	505	4.10	7,395	26.20

